

STATEMENT OF WORK

CONSTRUCTION SERVICES

FOR

**REPAIR OF CITY WATER PIPING,
PHASE 1**

NASA Glenn Research Center
Facilities Division
Project Management Branch

Project Number
ID No. 16785

Revision 1
March 12, 2013

TABLE OF CONTENTS

	<u>TITLE</u>	<u>PAGE</u>
PART 1	GENERAL	
	1.01 DESCRIPTION.....	3
	1.02 SCOPE	3
	1.03 PROJECT SCHEDULE	4
	1.04 GOVERNMENT FURNISHED INFORMATION.....	5
	1.05 PROCESS AND PROCEDURES	5
PART 2	PRODUCTS	
	2.01 DRAWINGS	8
	2.02 CONSTRUCTION SCHEDULES	8
	2.03 COST PROPOSALS.....	8
	2.04 CONSTRUCTION IMPLEMENTATION PLAN.....	8
	2.05 REPORTING.....	9
PART 3	EXECUTION	
	3.01 ORDER OF PRECEDENCE	10
	3.02 CONFERENCES AND MEETINGS.....	10
	3.03 SUBMITTALS	11
	3.04 CONSTRAINTS AND REQUIREMENTS	13
APPENDIX		
	NONE	

PART 1 GENERAL

1.01 DESCRIPTION

The project involves the replacement of the existing dual waterline system with the installation of new domestic water main distribution piping, branch service piping, isolation valves, and fire hydrants along designated portions of Stratton, Taylor, Ames, Moffett, Durand, and Walcott Roads including J-Road and K-Road. Included is lining the existing eastern 24-inch steel spiral-weld water main from the Main Gate valve pit, located at the facility's Brookpark Road entrance, to its point of intersection with the proposed 24-inch waterline, between Buildings 101 and 4. Work involves the system crossovers between existing and new, modification of existing domestic water service on the exterior and interior of buildings and installation of water meters at designated buildings, including the integration of water meters into the existing building management system. Work may include selective demolition, removal of contaminated soils, asbestos containing materials and lead containing paint. Work includes coordination and implementation of traffic control and barricading, utility isolations, temporary domestic water services, building plumbing systems, fire protection systems, electrical systems, and collateral equipment. The overall scope is further detailed in the Project Specifications and Drawings.

Contractor shall furnish all personnel, labor, equipment, material, tools, supplies, supervision, management, and services, except as may be expressly set forth as Government furnished, and otherwise do all things necessary to or incident to providing for the subject work at NASA Glenn Research Center's Lewis Field located at 21000 Brookpark Road, Cleveland, Ohio, 44135.

1.02 SCOPE

Construct the designated portions, known as the North Central Campus, of the Domestic Water system at Lewis Field as detailed in the project drawings and specifications.

The Base Bid scope requested to be performed is briefly summarized below:

- a. Install new water distribution mains along the designated roads of Stratton, Walcott, Taylor, Ames, Moffett, Durand, K-Road, and J-Road including associated spaces such as parking lots, miscellaneous paved (e.g. asphalt, concrete, sidewalks) and non-paved (e.g. lawn, yard) areas. Portions of the new water main indicated for J-Road is Bid Option # 2 and Taylor Road between Ames Road and South Durand Road is Bid Option # 3.
- b. Install branch service piping along the new domestic water mains with isolation valves as detailed in the drawings.
- c. Install new fire hydrants along new domestic water mains include all components required for fire hydrant installation as detailed. Included is the removal of existing fire hydrants and associated components as indicated.
- d. Reline the existing east 24 inch water main with a class IV structural liner between Brookpark Road and Building 4 (Hangar) as indicated on the drawings.
- e. Repair or replace areas impacted by construction activities and modifications such as pavement, sidewalks, curbs, yard and lawn areas.
- f. Provide temporary services to maintain domestic water for designated system users during construction as required or as part of the Contractor's Implementation Plan
- g. Contractor is responsible for the sequencing of the work with the review and approval of NASA factoring all areas and users impacted by road closures, temporary services, etc. during the implementation of the project scope.

The Bid Option # 1 scope requested to be performed is briefly summarized below:

Install the portion of J-Road water main between Building 24 and the indicated tie-point at Walcott Road near Building 49 and 140. This section is from Station 201+25 on CU-101 Sheet 38 of 51 to Station 210+88.40 on CU-101 Sheet 47 of 51 in the drawing set. Include all fire hydrants, isolation valves, connections and fittings along this designated section.

If this option is not exercised, the J-Road water main run will end at Station 201+25 on drawing CU-101 Sheet 38 of 51 which is downstream of the proposed branch for Building 24. Contractor shall provide the pressurized water main end/plug detail on C-501 Sheet 1 of 2 for the end of this particular service run.

The Bid Option # 2 scope requested to be performed is briefly summarized below:

Install water meters for the buildings in the drawing set. Included shall be the rework of existing piping related to the meter installation, electrical power for the meter, and control wiring between the meters, meter components and the energy management control system (EMCS) with the integration of the new water meter(s) to the GRC EMCS for active data collection.

The Bid Option # 3 scope requested to be performed is briefly summarized below:

Install the portion of Taylor Road water main between Ames Road and South Durand Road. This segment is expected to be installed in conjunction with the FY13 Steam Rehabilitation project. This section is from Valve V-13104 (Station 74+34.82) on CE-DOMW-COF16785-CU-101 Sheet 14 of 51 to Valve V-13124 (Station 87+19.40) on CE-DOMW-COF16785-CU-101 Sheet 18 of 51 in the drawing set. Include all fire hydrants installations and removals, future user at the Research Support Building (RSB), existing Buildings 12, 14 and 21 services, isolation valves, pipe segments for adjacent roads (e.g. Durand Rd), restoration of all disturbed areas and other connections / disconnections along this defined portion of the Taylor Road water main.

Contractor shall end the installation of adjacent junctions (e.g. Building 14 at Valve V-13109) at the isolation valve of the intersection except for Durand Road where the water main should be extended to a point outside the pavement limits of Taylor Road where the water main will be temporarily capped in a tree lawn or sidewalk area for connection by Base Bid water main segments. Propose using Durand Road Stations 131+00 and 140+50 for these work points.

Contractor shall provide a temporary tie-in downstream of V-13124 on Taylor Road near Building 162 Central Office Building (COB) to the existing domestic water to allow the pressure testing, flushing, disinfection and return to service for affected users and fire hydrants as applicable for implementation and sequencing purposes.

Note that this option is not documented within the drawing set or on the drawing index.

Review further scope requirements beyond those summarized above for the Base Bid and Bid Options in the applicable contract documents.

1.03 PROJECT SCHEDULE

NASA expects that all project work be completed no later than September 1, 2014, nominally 425 calendar days from contract award, with final invoicing submitted by the Contractor within thirty (30) calendar days of this date. This completion date includes demobilization from the site, final site clean-up, and receipt/approval of all closeout documentation.

All items exercised under this statement of work will occur in a fully operational environment while observing NASA-specific operations, safety and environmental processes.

Furthermore, the schedule of this project shall require the Contractor to coordinate with and work adjacent to many other activities of the Center, specifically the FY13 Repair Steam Distribution System, Phase 1 project. Both of the projects have significant impacts along portions of Taylor Road. The Contractor shall be required to coordinate with the Repair of Steam Distribution project team to facilitate joint construction efforts that permits efficient road closure durations and does not create excessive rework for items such as pavement and sidewalk repairs. The Steam project Taylor Road closure is tentatively scheduled between June and September, 2013.

Domestic water usage in many cases is critical to the operation of various facilities, infrastructure, fire suppression systems and central services at Lewis Field and all outages must be kept to a minimum.

1.04 GOVERNMENT FURNISHED INFORMATION (GFI)

The Government will furnish the following material and information which is applicable to all project requirements. The Contractor shall comply with and incorporate into the construction all the listed materials and information. These documents are incorporated into this document as if fully rewritten. Note that some of the information may be retrieved electronically as represented by the associated web site. Items listed below will be available as requested at, or soon after the initial post-award conference:

- a. NASA Glenn Environmental Programs Manual (<http://www.grc.nasa.gov/WWW/FTD/EEMO/documents/epm-TOC.pdf>)
- b. NASA Glenn Occupational Health Programs Manual (<http://smad-ext.grc.nasa.gov/shed/pub/ohpm/ohpm-manual.pdf>)
- c. NASA Glenn Safety Manual, (http://smad-ext.grc.nasa.gov/shed/pub/gsm/chapter_index.shtml)
- d. NASA GRC High Voltage Electrical Power System Operating Instructions
- e. NASA GRC Low Voltage Electrical Power System Operating Instructions
- f. NASA John H. Glenn Research Center Construction Contractor Manual, March 26, 2010
- g. NASA Requirements for Ground-Based Pressure Vessels and Pressurized Systems (NASA-STD-8719.17)
- h. Standard for Lifting Devices and Equipment (NASA-STD-8719.9)
- i. NASA Pressure Systems Office (PSO) Certification Instructions and Checklists
- j. NASA GRC Excavation Process Poster (PS-00826)
- k. FY13 Repair City Water Main Piping, Phase 1, Drawings, February 15, 2013
- l. FY13 Repair City Water Main Piping, Phase 1, Specifications, January 1, 2013
- m. FY13 Repair of City Water Main Piping, Phase 1, Geotechnical Report

1.05 PROCESS AND PROCEDURES

1. Request for Information

- a. The NASA Request for Information (RFI) process is a communication tool between the Government and the Contractor (and/or other stakeholders) to facilitate the flow of information, project direction, change requests for construction, clarifications, interpretations, other miscellaneous issues and their respective resolutions. The Contractor shall use the RFI process in their conveyance of project issues to the Government for resolution prior to the execution of any subject work. NASA Form C-9c shall be provided to the Contractor for use and submission with the NASA RFI process. An issuance of a RFI does not automatically imply a cause for a Government approved change proposal.

2. Equipment Logging Process

- a. The NASA equipment recording process is the development of a list of demolished, modified, and new equipment for the GRC maintenance program. The Contractor shall utilize NASA Form C-134 (CMMS Request For Modification) and its associated instructions to record all applicable equipment on this project.

3. Permits, Closures and Area Clearances

[Modification and/or Addendum to Specification 01 11 00.98 Summary of Work]

- a. The Contractor shall be responsible to obtain all GRC related permits and coordinate approvals through the NASA Project Team. Permits shall be managed as indicated in Specification 01 11 00.98 *Summary of Work* and the NASA Glenn Safety Manual prior to the execution of the subject work.
- b. For permits external to NASA (e.g. OEPA Notice of Intent, Asbestos removal), the Contractor shall provide the appropriate documentation, fund the permitted activities and obtain the permit approval prior to field operations.
- c. An Area Clearance (AC) is the established process that informs the subject system stakeholders that their use of the system will be affected by the project and for a defined duration. The AC shall be required to be routed two (2) weeks prior to the subject work. The AC approvals, using NASA form C-978, shall be coordinated between the NASA Project Team and the Contractor prior to the subject field work.
- d. Roadways, Driveways, Parking Lots and Sidewalk closures shall require a two (2) week notification by the Contractor to the NASA Project Team prior to the planned activity. Once closure plans are approved by NASA using form C-136 Barricading Request, the Contractor can then prepare and execute the road closure activities.

Refer to the Maintenance of Traffic (MOT) drawings provided to assist in the planning for these activities during construction.

Contractor shall be required to maintain traffic, both vehicle and pedestrian, with the use of road plates, temporary paths or other approved means to minimize traffic flow impacts for all project area closures and crossings. At no time should there be an expectation that an entire road or sidewalk area can be fully closed so as to maintain some level of access for safety and security purposes.

- e. Fire Prevention and/or Protection systems compromised by the temporary loss of domestic water service or other related work activities shall require the Contractor to complete a Fire Impairment Authorization, NASA Form C-316. The form shall be routed two (2) weeks prior to the subject work. The Contractor shall provide all required materials and resources in the approved authorization including dedicated Fire Watch personnel.

4. Electronic Submittals

[Modification to Specification 01 33 00.98 Submittal Procedures]

- a. An electronic submittal process is planned to be utilized for all project submittals. The Government has established, and will provide access for the Contractor to, an electronic Document Management System (EMC Corporation eRoom). All project submittals will be submitted, managed and returned through this eRoom process.

- b. Representatives of the prime contractor will be given access to the eRoom. Those granted access to the eRoom shall be required to obtain NASA IT security clearance and are required to complete on-line security training (approximately one hour in length) in order to achieve security clearances required to access the eRoom. Subcontractors will not be granted access to this eRoom therefore the prime Contractor shall be responsible for managing the flow of information into and out of the eRoom for the Contractor's team needs. NASA will supply the Contractor with instruction and guidance on using the eRoom submittal process.
- c. A Submittal Log within the eRoom is used to document the submittal approval process. Propagating data in the Submittal Log will be performed by the Government. The Contractor shall upload submittals (in Adobe PDF format) into the eRoom into a single designated folder.

Subcontractors will not have access to eRoom; electronic submissions to the Government will be performed by the prime contractor only. The Government will create an entry for each submittal in the Submittal Log showing information such as submittal number, assignees, approval codes, and related dates. The entry will be shown as "Open" while the review is in progress. The change of a submittal entry from "Open" status to "Closed" status is the indication to the contractor that the review is complete and the submittal is finalized. Government comments and final approval codes will be entered into each entry for use by the contractor (no hard copies of comments will be provided). Submittals shall be completely in electronic format, unless otherwise indicated, until the submittal is approved. Upon submittal approval, the contractor shall provide three (3) hard copies to the Government within 5 working days of approval for submittal entries designated as "Hard Copies Required".

- d. The submittal numbering format shall be approved by the Government and shall be based on the specification section requiring the submittal. Each submittal number shall contain a numerical suffix to be used to indicate resubmittals, such that the original submittal number can remain unchanged from original submission to final approval if resubmittals are required. Submittals containing more than one referenced specification section will be rejected. A standard transmittal form approved by the Government shall be used to transmit each submittal and shall be the first page of the submittal.

5. Government Inspections for Quality Assurance and Safety

- a. NASA, during the course of this project, will be providing its own team of Quality Assurance Technicians, Engineers and Inspectors to represent the interests of the Government. This action does not relieve the Contractor from providing its own team for Safety, Quality Assurance and Quality Control. The Contractor shall make all areas of the overall project available daily to the NASA Project Team and designees during normal business hours, extended/off hours and by request. All contract documents shall be made available to the NASA Project Team members in the on-site project office at all times. The NASA Project Team or designees will provide a representative(s) for all Government inspections on project elements such as but not limited to site safety, factory acceptance & testing, off-site locations, third party tests, soil proctors, material and equipment installations, pressure testing, equipment activation, etc. The Contractor shall not cover or otherwise obscure any project work prior to the witnessing of the Government. Work not appropriately witnessed by NASA may require the Contractor to perform rework to expose subject work for proper inspection at no additional cost to the Government. Full coordination and cooperation between the NASA Project Team and Contractor team is required for Government inspections.

PART 2 PRODUCTS

2.01 DRAWINGS

1. A “shop drawing” as defined for this project is a drawing or set of drawings produced by the contractor, supplier, manufacturer, subcontractor, or fabricator to facilitate the contract work with the appropriate connections, fabrications, layouts and product specifics. This type of drawing shall be provided to the Contracting Officer’s Representative (COR) as called for in the project specifications or this document.
2. A “coordination drawing” as defined for this project is a drawing or set of drawings produced by the contractor critical to the management of the installation and shop drawings of the trades (e.g. steel work, sheet metal ductwork, piping, plumbing, fire protection, electrical, etc.). This type of drawing shall be provided to the COR as required to execute the project, clarify items supplied and to reduce or best eliminate rework, errors and omissions.
3. An “as-built” as defined for this project is a drawing or set of drawings submitted by the Contractor to the COR prior to project final payment and no more than thirty (30) calendar days after project Final Acceptance. The as-built documents shall reflect the exact features, dimensions, geometry, and location of all elements of the work completed under the contract. The as-built documents shall be submitted as red-lined versions to the COR for review and acceptance.

2.02 CONSTRUCTION SCHEDULE

1. The Contractor shall prepare a detailed construction schedule (use of Microsoft® Project 2007 is preferred) for this project indicating procurement, fabrication, demolition, and installation including switchovers from existing, temporary and new water mains and their apperturances, including building services. The schedule shall include a graphic schedule (Gantt chart) indicating sequence of events and interrelationships using the critical path method (CPM). Overtime and/or off-normal hours shall be indicated in the schedule. The schedule shall be updated and submitted to the NASA Project Team bi-weekly reflecting work progress (planned and/or performed) during the execution of this project.

2.03 COST PROPOSALS

1. The Contractor shall prepare the Construction Project Proposal (CPP) as a fixed price amount for furnishing all services, labor and material for the base and bid option(s) individually. Individual line item costs associated with base bid and bid options shall be provided on a per unit basis.
2. A cost proposal for the work scope indicated can be provided with alternative methods than those detailed in the drawings. Contractor shall account for and provide additional Maintenance of Traffic (MOT) controls, enhanced road/sidewalk closures and barricading, added rework to existing underground infrastructure, additional soil removal and backfill materials, and extended restoration of pavements that will be required when utilizing alternative methods beyond those indicated in the drawings for their cost proposal.

2.04 CONSTRUCTION IMPLEMENTATION PLAN

1. The Contractor shall prepare a comprehensive *Construction Implementation Plan* which shall include, but need not be limited to, the following outline items:
 - a. Project description.
 - b. Design and Construction periods.

- c. Personnel impact.
 - d. Utilities impact.
 - e. Research impact.
 - f. Other conditions or hazards.
 - g. Safety review.
 - h. Personnel contacted.
 - i. Required permits and forms.
 - j. Security requirements.
 - k. Special considerations, e.g. soil sampling, notifying building occupants.
 - l. Off-hour work.
 - m. Equipment relocation/delivery.
 - n. Parking/circulation impact.
 - o. Road, Parking Area, and Walk Closure Plans.
 - p. Traffic and Pedestrian Detour Plans.
 - q. Contractor's Quality Control and Configuration Management Plans
2. The Contractor shall develop a *Construction Implementation Plan* and submit the plan to NASA for review and concurrence within (30) thirty days after contract award.

2.05 REPORTING

1. Weekly Project Meetings
 - a. The Contractor shall attend weekly project meetings scheduled by the Government. Subcontractor representatives shall attend.
 - b. The Contractor shall prepare a Three-Week Planning Schedule for discussion at each weekly project meeting, highlighting construction progress, utility outages, material deliveries, subcontractor's onsite, equipment onsite, coordination issues and updates to the baseline schedule. Meeting minutes shall be kept by the NASA Construction Manager and distributed after signed concurrence by the NASA Project Manager and the Contractor.
2. Monthly Progress Reporting
 - a. The Contractor shall provide a monthly progress report at the beginning of each month after the contract award. The monthly project progress report shall include the name of the project, name of the Contractor(s), date of the report, reporting period and a brief project description. The Monthly Progress Report shall cover five specific areas as listed below:
 - i. A description of technical progress and accomplishments, problems encountered and planned solutions for the existing reporting period and progress planned for the next period.
 - ii. An updated copy of the Gantt chart schedule showing progress against plan with the critical path identified.
 - iii. An updated cost report showing actual costs for the reporting period, cumulative costs, budgeted costs, and projected costs.
 - iv. A discussion of Administration, Project Management or other items which are pertinent to the reporting period.
 - v. A summary of safety related issues pertinent to the reporting period and task as a whole: mishap reports, hazardous materials or confined space work performed / documentation prepared or required, identification of upcoming work that needs safety preparation, etc.

PART 3 EXECUTION

3.01 ORDER OF PRECEDENCE

The project has established an Order of Precedence for the various contractual documents and their roles in resolving requirement issues. Any inconsistency in this document, solicitation or contract shall be resolved by giving precedence in the following order:

- a. Government Request for Proposal
- b. Contractor Proposal
- c. Government Contract and Contract Modifications
- d. Project Specifications
- e. Project Drawings
- f. Project Submittals

For instances where project specification section to project specification section differ, the more rigorous requirement(s) shall apply.

3.02 CONFERENCES AND MEETINGS

1. After the award of this contract and prior to beginning of the construction activity, an initial conference (Post Award Meeting) between the Contractor project team and the NASA project team, will take place at the NASA Glenn Research Center. The NASA Project Manager shall organize the session and/or sessions and coordinate with the Contractor for attendance.

The Government has the following desired outcomes with the Post Award Meeting:

- a. Interaction between the Contractor and all associated representatives with the NASA Project Team.
 - b. Presentation of the Contract and Contractor's Proposal to all project team members.
 - c. Achieve consensus from the NASA Project Team on any issues and concerns with the Contractor's Implementation Plan.
 - d. Establish and explain policies and procedures for the completion of a successful project.
 - e. Establish clear lines of communication and points of contact (POCs) for Government and Contractor team members.
 - f. Establish the submittal packaging and construction schedule. All items shall be in accordance with the appropriate Specification Sections provided. Discuss milestones and events that will be included in the Quality Control Plan.
 - g. Establish clear expectations for turnover from the Contractor to the Government.
2. Other meetings and electronic communications between the Contractor's representatives and the NASA project team shall take place to assure complete communications and agreement of ideas and expectations to achieve the final objectives. The Government intends to establish an on-line shared folder website, known as eRoom, to be accessible by designated NASA and Contractor project personnel. The files contained therein shall be in Adobe® PDF or Autodesk® DWF format where practical so as to aid in dialogue but prohibit unauthorized revisions.
 3. The Contractor shall be responsible for taking notes at all conferences and meetings except as indicated in Division 01, Section 01 31 19.98. Notes of conferences and meetings shall be

submitted within five (5) working days of the occurrence. The Contractor shall acknowledge, in the conference notes, transmittal of any material between parties, submit copies of any correspondence pertinent to the execution of the contract, and provide a brief statement of job progress. The above information shall be transmitted to the COR via e-mail (ATTN: Paul.A.Kuehn@nasa.gov) for forwarding to the NASA project team as required. If the NASA project team has any comments concerning the notes, they will so advise the Contractor within five (5) working days of receipt of the notes, and these comments shall be included at the beginning of the next scheduled set of notes. Pertinent items in telephone conversations between the Contractor's representatives and NASA Project Team shall be discussed, noted and included at the beginning of the next scheduled set of notes as applicable.

4. Upon completion of the project or when requested by the COR, the Contractor shall return all Government-furnished material, including drawings, sketches, and documents listed in Part 1, Paragraph 1.04 to the COR.

3.03 SUBMITTALS

1. General Requirements

- a. The Contractor shall transmit to the NASA COR or appointed designee for review and approval submittals of the various contract documents as described in the Project Specifications Division 01, Section 01 33 00.98 *Submittal Procedures*.
- b. All drawings, disks, and other documents submitted by the Contractor for approval along with accompanying transmittal letters shall be sent directly to:

National Aeronautics and Space Administration
John H. Glenn Research Center
Attn: Paul Kuehn (COR)
Facilities Division, M.S. 21-15
21000 Brookpark Road
Cleveland, OH 44135
- c. Correspondence other than submittals shall be forwarded in quadruplicate to the COR with the NASA contract number marked on each transmittal.
- d. Each submittal will be reviewed by the NASA project team with approval and/or comments and shall be returned to the Contractor within ten (10) working days after receipt. All changes will be reviewed and acknowledged for incorporation into the construction.

2. Project Deliverables

- a. Review specific provisions of the construction in the drawings and specifications.
- b. Contract Schedule of Values

The Contractor shall prepare and submit for approval a Schedule of Values for the project. Each project element shall be separately decomposed according to the Work Breakdown Structure (WBS). The Schedule of Values shall include the following: Items under each milestone, Unit Quantity, Unit of Measure, Unit Cost (Labor), Total Cost (Labor), Unit Cost (Material), Total Cost (Material) and Total Item Cost. Shipping costs shall be added to the total material cost. Supervision, overhead, profit, and bond shall be added to the compiled costs. The Schedule of Values shall be based on AIA Document G702 and G703 or other NASA approved form.

The Government shall withhold two percent (2%) of the contract value for the final

acceptance punch list, as-built drawings and O&M manuals, totaling six percent (6%) of the contract value, and pay on these line items only when the submission of each item is 100% complete and accepted by the Government. The Schedule of Values shall include specific line items for the each of these withholdings.

c. Health & Safety

NASA policy requires that Contractors submit site specific safety and health plans (SSHASPs) as part of the contract and as described in Division 01, Section 01 35 26.98 *General Safety Requirements*.

A construction (or field) Notice to Proceed (NTP) will be issued after the Contractor's SSHASP is approved by NASA. No site work shall begin without a NTP letter signed by the COR.

d. Quality Assurance / Quality Control (QA/QC) Plan

The Contractor shall prepare, and submit for Government approval, a Quality Assurance and Control Plan including requirements from Division 01, Section 01 45 00.98 *Quality Control*. This document will define the Contractor's plan to apply relevant assurance principles and techniques to ensure the project will be successfully accomplished and the applicable contract requirements and specifications will be satisfied.

The plan shall identify all elements of the quality assurance organization, and describe the objectives, implementation policies and procedures, and configuration control systems utilized throughout construction, fabrication, delivery, and commissioning to provide quality products and materials.

e. Project Operational Documentation

The Contractor shall prepare and submit to the Government documentation as detailed in Division 01, Sections 01 70 00.98 *Closeout Submittals* and 01 78 23 *Operations and Maintenance Data* which includes the following system documentation:

- i. As-built Drawings
- ii. Operation manuals
- iii. Maintenance manuals
- iv. Software programming details and instructions
- v. Equipment list with nameplate data and location.

In-Process (or Working) versions of these documents shall be made available to the Government during the Activation phase of the systems.

f. Personnel Training on Installations

The Contractor shall provide comprehensive training on the systems, equipment, hardware and software for the Government's personnel and representatives in the operation, configuration, and maintenance of the systems. The training shall include all manuals and materials required.

The training shall be conducted by those directly experienced with the supplied equipment and be of sufficient depth that the trainees will be qualified to operate, maintain, troubleshoot, and train future operators in the systems furnished under this project.

Training duration shall be as per the approved project specification for each subject facility system or a minimum of 4 hours (class room and field operations) per each distinct equipment or component item if not identified by specification.

g. Project Closeout

The minimum requirements for closeout documentation and implementation shall be as indicated in Division 01, Section 01 78 00 *Closeout Submittal*.

A Final Acceptance Punchlist (FAP) shall be used by the Contractor and NASA to manage the reception of the project facilities and systems. The Government shall be responsible to develop the punchlist during the course of the project, including any stakeholder sponsored items. The Contractor shall facilitate the execution of the complete list to the satisfaction of the Government prior to final payment.

The Contractor shall be responsible for the proper installation of the construction as specified. Preliminary and Final Acceptance testing shall be performed by the Contractor as a part of their QC program throughout the installation process and immediately thereafter to verify that the installation is acceptable and to establish the required baselines. Not until this is complete will the equipment or facility be accepted by NASA for turnover.

Final Acceptance of the project as defined by NASA will occur after the Contractor has provided to the COR all project related final documentation and drawings for startup, commissioning, and testing and receives notification of its review and concurrence from the Government. Completed elements such as the validation and verification of systems are part of the criteria required for Final Acceptance.

3.04 CONSTRAINTS AND REQUIREMENTS

1. Interruption of Services

- a. It is intended that all work be performed while the existing domestic water functions are maintained to the extent practical. Planning will require second shift or weekend work and protection of areas not directly involved in individual construction line items. The disruption, tie in and restoration of utilities and services must be carefully scheduled and planned outside of standard operating hours, and approved by the Government to minimize the impact to the buildings or operations. Loss of function to any branch/end user shall be limited to a maximum of 48 hours.
- b. The use of temporary service mains and/or branches will be discussed on a case by case basis and utilized to the benefit of the affected users at no additional cost to the Government when implemented by the Contractor.
- c. NASA maintenance and research operations personnel periodically need access to valves, equipment and services that may be at or adjacent to the subject work. The Contractor must ensure that this accessibility for continuation of services is maintained during construction activities.
- d. NASA GRC's on-site maintenance contractor shall be responsible for the opening and closing of all valves in existing systems, which will be scheduled through the NASA Project Team as needed. The Contractor is not permitted to operate existing valving. The coordination of this activity is managed through the GRC Area Clearance process as explained in the *Construction Contractor Manual* and Section 1.05 of this document. The

Contractor shall review and adhere to the NASA Lock Out / Tag Out (LOTO) requirements presented in Chapter 9 of the Glenn Safety Manual.

- e. Contractor shall complete the full restoration of hard surfaces (e.g. asphalt, concrete) in the immediate work areas before proceeding to the next planned segment. Landscape and lawn areas are preferred to be fully restored similar to hard surfaces but can be completed at a later time provided their lack of restoration is not an impact to the Center, affected building / area or environmental considerations (e.g. SWP3, etc.).
3. Government equipment must be protected from damage during the construction.
 4. Contractor personnel are prohibited from entering building areas unless coordinated by the NASA project team to do so. Access to various building areas is restricted due to personnel safety, operational safety and security concerns.
 5. Temporary controls and measures must be erected by the Contractor in accordance with OSHA regulations. Areas of concern for the project, such as open excavations which have unguarded edges, limited accessibility and standing water require such controls. Shoring and Scaffolding erected by the Contractor is subject to review and approval by NASA, to ensure the safety of workers. When erecting shoring or scaffolding, the Contractor shall address accessibility, anchor points, load capacity, etc., as well as the safety of personnel and equipment below. Under no conditions will workers be permitted to scale or use as work points the existing piping or conduits. These measures shall be addressed in the Contractor's HASP and based upon a thorough inspection of the work site by the Contractor.
 6. The Contractor shall provide temporary power, lighting and ventilation throughout work areas as needed to ensure safe and productive working conditions. Temporary electrical circuits shall not be installed in any live electrical panel without the express permission of NASA. All temporary provisions shall be completely removed by the Contractor upon project completion.
 7. The Contractor shall provide protection for personnel and equipment when working near live electrical equipment. Electrical equipment, including underground duct banks, shall be protected in a manner that prevents damage from inadvertent contact/collision, disturbance, falling objects, hot work (e.g. sparks, weld slag, etc.) and leaks/spills.
 8. NASA does not permit the following activities during normal business hours that could endanger building occupants, bystanders, visitors or others:
 - a. Pneumatic testing of pressure or process systems
 - b. Radiographic examination or testing

These activities must be scheduled for off-hours (e.g. 2nd or 3rd shift) or weekend shifts. Approval of requests for off-hours activities is subject to NASA operational schedules and will be considered on a case-by-case basis. NASA shall incur no additional costs for performing these activities during off-hours or weekend shifts.

9. Property Passes
 - a. Any materials, instruments, parts, supplies, machinery, tools or equipment require a property pass in order to remove them from the GRC. The QA or a designee will provide the property pass after they have inspected the vehicle and cargo. A copy of the Property Pass must be given to the guards at the gate by the driver before leaving the GRC.

10. Standard Operating Hours and Federal Holidays

- a. The standard hours of operation for GRC are 6:00 am till 6:00 pm, Monday through Friday. Normal construction hours are 7:00am to 3:30pm. If additional work outside of this time is required, the contractor must coordinate this with the QA at least 24 hours prior to working an extended shift.

Work shall not be planned or scheduled for the following federally recognized holidays:

- i. New Year's Day
- ii. Martin Luther King Day
- iii. Washington's Birthday (Presidents Day)
- iv. Memorial Day
- v. Independence Day
- vi. Labor Day
- vii. Columbus Day
- viii. Veterans Day
- ix. Thanksgiving Day
- x. Christmas Day

Access to the GRC outside of the standard operating hours requires prior notice with an After Hours Request form. This form is to be filled out and submitted to the NASA Quality Assurance Specialist (QA) or Construction Manager (CM). NASA requires at least 24 hours prior notification of all After Hours work.

11. Prime Contractor Oversight

- a. The Superintendent is required to be onsite at all times that construction is occurring. The prime contractor will provide 100% supervision over all construction on the project.
- b. The Safety & Health Officer is required to be onsite at all times that construction is occurring.

12. Domestic Water System Interfaces

- a. Existing Isolation Valves

Domestic water system isolation valves may have functional issues related to full shutoff during the performance of the project scope. Outages may require the implementation of several valves beyond the initial designated isolation valves to facilitate the coordinated field effort. When additional isolation valves are required or other isolation methods utilized, there is a possibility that the planned outage may be cancelled to reassess the ability to perform the work and to notify additional impacted users in a subsequent outage.

- b. Siemens EMCS

Contractor shall be required to coordinate with the Siemens GRC on-site personnel to facilitate the integration of the water meters including programming updates for the existing Siemens based EMCS. Contractor shall provide any and all interface cards and/or modules as appropriate such that the new water meters will function with the existing system. Programming updates shall include displaying the data collected and manufacturer of the device (e.g. Sitrans) on the data screen similar to the current cadre of existing meters.